

WHAT IS CLAIMED IS:

1. A receive method in a communication system, comprising the steps of:

- 5 receiving a receive signal converted into a carrier band;  
generating a quadrature signal from said receive signal;  
compensating orthogonality error and gain  
10 imbalance for said receive signal and said quadrature signal; and  
converting said receive signal and said quadrature signal into first complex frequency band signal by first analytic sine wave, said first  
15 analytic sine wave being a complex signal including cosine wave as the real components and including sine wave as the imaginary components.

20

2. The receive method as claimed in claim 1, said step of compensating orthogonality error and gain imbalance comprising the steps of:

- 25 dividing said quadrature signal into divided quadrature signals;  
assigning weight to each of said divided quadrature signals;  
adding said receive signal to one of said  
30 divided quadrature signals.

35

3. The receive method as claimed in claim 1, said step of compensating orthogonality error and gain imbalance comprising the steps of:

assigning weight to each of said  
quadrature signal and said receive signal; and  
adding said quadrature signal and said  
receive signal.

5

4. The receive method as claimed in claim  
10 2, further comprising the step of:  
converting, after said step of  
compensating, said receive signal and said  
quadrature signal into second complex frequency band  
signal by second analytic sine wave, said second  
15 analytic sine wave being a complex signal including  
cosine wave as the real components and including  
sine wave as the imaginary components.

20

5. The receive method as claimed in claim  
4, wherein said weight is determined according to  
said second complex frequency band signal converted  
25 by said second analytic sine wave.

30 6. The receive method as claimed in claim  
2, further comprising the step of:  
estimating a desired signal on the basis  
of said first complex frequency band signal  
converted by said first analytic sine wave.

35



11. The receive method as claimed in claim 7, further comprising the steps of:

5 detecting a difference signal on the basis of said first complex frequency band signal, a predetermined signal and said desired signal;

determining said weight according to a complex frequency band signal and said difference signal.

10

12. The receive method as claimed in claim 6, further comprising the steps of:

sampling said first complex frequency band signal at symbol rate;

15 detecting a difference signal according to a predetermined signal, a sampled signal and said desired signal; and

20 determining said weight according to a complex frequency band signal and said difference signal, and controlling said sampled signal to be a predetermined sampling phase.

25

13. The receive method as claimed in claim 7, further comprising the steps of:

sampling said first complex frequency band signal at symbol rate;

30 detecting a difference signal according to a predetermined signal, a sampled signal and said desired signal; and

35 determining said weight according to a complex frequency band signal and said difference

signal, and controlling said sampled signal to be a predetermined sampling phase.

5

14. A receive method in a communication system, comprising the steps of:

- receiving a receive signal converted into  
10 a carrier band;  
performing analog quasi-coherent detection on said receive signal and outputting in-phase and quadrature signals;  
performing analog-to-digital conversion on  
15 said in-phase and quadrature signals;  
dividing said in-phase and quadrature signals into first in-phase and quadrature signal and second in-phase and quadrature signal;  
converting said first in-phase and  
20 quadrature signal into a complex baseband signal by a first analytic signal, and converting said second in-phase and quadrature signal into a complex baseband signal by a second analytic signal;  
applying said first in-phase and  
25 quadrature signal to a first low-pass filter, and applying said second in-phase and quadrature signal to a second low-pass filter;  
applying said first in-phase and quadrature signal passed through said first low-pass  
30 filter and said second in-phase and quadrature signal passed through said second low-pass filter to an adaptive interference canceler; and  
removing interference components included  
35 said first in-phase and quadrature signal and said second in-phase and quadrature signal.

15. The receive method as claimed in claim  
14, wherein said adaptive interference canceler  
5 separates desired frequency band components and  
interference signal components, by using  
orthogonalization coefficients, from an input signal  
in which said desired frequency band components and  
said interference signal components are mixed.

10

16. The receive method as claimed in claim  
15, wherein said adaptive interference canceler  
estimates said orthogonalization coefficients  
according to changes of orthogonality in said analog  
quasi-coherent detection.

20

17. A receiver in a communication system,  
comprising:  
25 a receiving part which receives a receive  
signal converted into a carrier band;  
a generating part which generates a  
quadrature signal from said receive signal;  
a compensating part which compensates  
30 orthogonality error and gain imbalance for said  
receive signal and said quadrature signal; and  
a first converting part which converts  
said receive signal and said quadrature signal into  
first complex frequency band signal by first  
35 analytic sine wave, said first analytic sine wave  
being a complex signal including cosine wave as the  
real components and including sine wave as the

imaginary components.

5

18. The receiver as claimed in claim 17,  
said compensating part comprising:

10 a dividing part which divides said  
quadrature signal into divided quadrature signals;  
an assigning part which assigns weight to  
each of said divided quadrature signals;  
an adding part which adds said receive  
signal to one of said divided quadrature signals.

15

19. The receiver as claimed in claim 17,  
said compensating part comprising:

20 an assigning part which assigns weight to  
each of said quadrature signal and said receive  
signal; and  
an adding part which adds said quadrature  
signal and said receive signal.

25

20. The receiver as claimed in claim 18,  
further comprising:

30 a second converting part which converts  
said receive signal and said quadrature signal,  
which are compensated, into second complex frequency  
band signal by second analytic sine wave, said  
35 second analytic sine wave being a complex signal  
including cosine wave as the real components and  
including sine wave as the imaginary components.

5                   21. The receiver as claimed in claim 20,  
further comprising a first control part which  
determines said weight according to output from said  
second converting part.

10

15                   22. The receiver as claimed in claim 18,  
further comprising:

an estimating part which estimates a  
desired signal on the basis of output from said  
first converting part.

20

25                   23. The receiver as claimed in claim 19,  
further comprising:

an estimating part which estimates a  
desired signal on the basis of output from said  
first converting part.

30

35                   24. The receiver as claimed in claim 22,  
further comprising a second control part which  
determines said weight according to output from said  
estimating part and output from said first  
converting part.



5                   25. The receiver as claimed in claim 23,  
further comprising a second control part which  
determines said weight according to output from said  
estimating part and output from said first  
converting part.

10

15                   26. The receiver as claimed in claim 22,  
further comprising:  
a detecting part which detects a  
difference signal on the basis of said first complex  
frequency band signal, a predetermined signal and  
said desired signal;  
20                   a determining part which determines said  
weight according to a complex frequency band signal  
and said difference signal.

25

27. The receiver as claimed in claim 23,  
further comprising:  
a detecting part which detects a  
30 difference signal on the basis of said first complex  
frequency band signal, a predetermined signal and  
said desired signal;  
a determining part which determines said  
weight according to a complex frequency band signal  
35 and said difference signal.

28. The receiver as claimed in claim 22,  
further comprising:

5 a sampling part which samples said first  
complex frequency band signal at symbol rate;

a detecting part which detects a  
difference signal according to a predetermined  
signal, a sampled signal and said desired signal;  
10 and

a determining part which determines said  
weight according to a complex frequency band signal  
and said difference signal, and controlling said  
sampled signal to be a predetermined sampling phase.  
15

29. The receiver as claimed in claim 23,  
20 further comprising:

a sampling part which samples said first  
complex frequency band signal at symbol rate;

a detecting part which detects a  
difference signal according to a predetermined  
25 signal, a sampled signal and said desired signal;  
and

a determining part which determines said  
weight according to a complex frequency band signal  
and said difference signal, and controlling said  
30 sampled signal to be a predetermined sampling phase.

35 30. A receiver in a communication system,  
comprising:

a receiving part which receives a receive

signal converted into a carrier band;

an analog quasi-coherent detector which performs analog quasi-coherent detection on said receive signal and outputting in-phase and

5 quadrature signals;

an analog-to-digital converter which performs analog-to-digital conversion on said in-phase and quadrature signals;

10 a dividing part which divides said in-phase and quadrature signals into first in-phase and quadrature signal and second in-phase and quadrature signal;

35 a first converting part which converts said first in-phase and quadrature signal into a complex baseband signal by a first analytic signal, and a second converting part which converts said second in-phase and quadrature signal into a complex baseband signal by a second analytic signal;

20 a first low-pass filter which removes high frequency band components from said first in-phase and quadrature signal to, and a second low-pass filter which removes high frequency band components from said second in-phase and quadrature signal;

25 an adaptive interference canceler which receives said first in-phase and quadrature signal passed through said first low-pass filter and said second in-phase and quadrature signal passed through said second low-pass filter, and removes interference components included in said first in-phase and quadrature signal and said second in-phase and quadrature signal.

35

31. The receiver as claimed in claim 30, said adaptive interference canceler including a part

which separates desired frequency band components  
and interference signal components, by using  
orthogonalization coefficients, from an input signal  
in which said desired frequency band components and  
5 said interference signal components are mixed.

10 32. The receiver as claimed in claim 31,  
said adaptive interference canceler including an  
adaptive controller which estimates said  
orthogonalization coefficients according to changes  
of orthogonality in said analog quasi-coherent  
15 detector.

20

25

30

35